

Moving in with Care: About Patient Safety as a Spatial Achievement

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Abstract

This article argues that patient safety is also a spatial achievement. To demonstrate this, the author aims to accomplish a spatial analysis with a focus on the coordinating and problem-solving role of the (material) environment and a focus on the way spatial order is produced by safety activities. To gain insight into the spatiality of patient safety, the author follows doctors and nurses while they deal with an unplanned admission of a newborn baby to the neonatal intensive care unit. The analysis especially focuses on the crucial role of the collaborative work of the doctors and nurses in the preservation of patient safety. As the point of departure for the analysis, the author considers space as integral to social action and as something created in the turbulence of social action. This enables the author to go beyond a mere description of how the spatial arrangement of the ward is a part of safety measures. The mobility work that is involved in a safe and smooth collaboration will also be taken into account. The analysis of their mobility patterns on different levels of scale displays the intertwinement between layers of safety and the spatial layers of the neonatology ward.

Keywords

hospital ethnography, spatial ordering, ICU, neonatology, mobility work, collaboration, ad hoc team

This article explores the relationship between the spatial environment and patient safety activities in a high-technology hospital unit: the intensive care unit for newborns.¹ This intensive care unit takes care of those children whose lives are seriously at risk on account of complications linked to their delivery, congenital diseases, infections, or premature birth. The vulnerable patient population of the neonatal intensive care unit (NICU) calls for a high level of patient safety. Using the expertise of other high-risk industries, the main strategy in health care is a prevention of adverse events by detecting and eliminating causes of error (Kohn, Corrigan, & Donaldson, 2000). Complementary to this approach, I would like to propose a focus on the texture of safety itself. After all, the preservation of sound and safe practice is based not only on the elimination of risks and the absence of errors but also on the identification and understanding of the

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vigour of health care practices.² Considering the high-risk environment and the innumerable complexities involved, we have ample reason to ask ourselves why things do not go wrong more often. What is it exactly that makes practices safe? In answering this question, I would like to focus on one particular aspect of safety: its spatial dimension. Patient safety is, as I will argue, also a spatial achievement. To demonstrate this, I will perform a spatial analysis of an unexpected admission on an NICU of a Dutch hospital, with special attention for collaborative activities.³ As the point of departure for my analysis, I consider space as integral to social action and as something created in the turbulence of social action. This enables me to ask the question, "How are hospital spaces made up by safety activities?" The mobility work that is involved in a safe and smooth collaboration will also be taken into account. Let us take a closer look at this co-constitution of spatiality and patient safety.

The NICU as a Controlled Place

A phone is ringing. One of the NICU nurses picks it up. While she listens to a colleague of the emergency department (ED) she turns around and looks at the neonatologist who is examining one of the babies in the corner of the NICU ward. After hanging up she walks to the corner and informs him that a mother and her baby will be admitted and are already in the elevator on their way up. "What about the ED staff?" the doctor asks. "Is one of them joining them for the handover?" "Yes, the one who did the admission is coming up as well," the nurse replies. The neonatologist looks at the isolation room that is occupied by Jill, a baby admitted a few days ago. "Jill no longer needs to be in the isolation room and her incubator can be moved to bed number 10," the doctor instructs the nurse. They both realize that they have to act quickly because the new admission has been born at home and therefore requires isolation.

The admission of a child to the NICU sets in motion a process that initially is fully geared to the child's incorporation into the unit's everyday practice. If newly admitted children tend to be wheeled into the NICU, often in a hurried fashion, those born at home need to be treated in a special way. Since these children were not born in the controlled environment of a hospital setting, they may potentially carry infectious germs. To accomplish the delicate task of preventing transmission of possible infectious agents to the other children on the NICU, there are a series of buffers installed, some of which are permanent and others temporary. One of the most obvious buffers against germs is the isolation room. This involves a separate, single bedroom on the ward (see Figure 1). As a rule every admission of an out-born baby has to stay in the isolation room first. Only after he or she has proven "to be clean" is the patient allowed to move to the open section of the intensive care unit. This isolation practice is an important part of hospital infection control precautionary measures. The isolation room prevents extremely vulnerable patients getting infected *and* prevents infected patients contaminating others. In other words, the isolation room is a heterogeneous space that is constituted by its specific set of relations. It is, in the words of Foucault (1986), a "heterotopia": a place that puts together different spaces that are in themselves not compatible (p. 27).

The isolation room is not the only spatial arrangement on the ward that is part of infection prevention. Limited access to the ward also has to be considered as an intentional safety measurement. There are only two entrances to the ward. One is restricted to incubators and their company (neonatology staff or ambulance personnel). The other door is the formal entrance through which staff and parents enter the ward. However, this door does not give direct access to the ward. Instead one enters an airlock first. The vulnerability of the patients on this ward calls

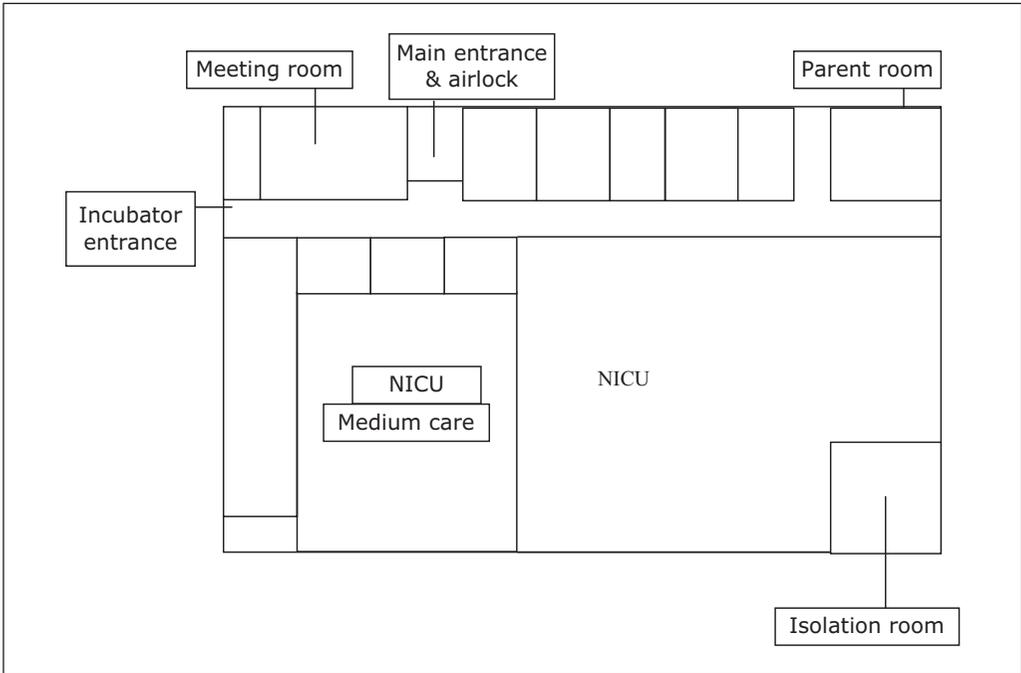


Figure 1. Explanatory sketch of the spatial arrangement of the neonatology ward

for a strictly controlled environment, and hygienic rules need to be strictly adhered to. This is why on entrance staff members and parents and other visitors have to pass through an airlock that marks the transition from the cold, contagious outside world to a warm, cleaner, and carefully regulated world inside. This airlock is built to keep the germs out. Overpressure and hygienic rules should ensure that bacteria do not enter the space.

The airlock and the isolation room underline the significance of the germ theory in contemporary medicine.⁴ The germ theory claims that microorganisms are the cause of many diseases. The concept of threatening microbiological forms has not only induced the development of antibiotics and hygienic practices but has also changed the architectural design of the hospital including its neonatology ward. Specific parts of the ward, such as the airlock and the isolation room, are explicitly designated for safety practices related to infection prevention. Following Prior (1988), these architectural features have to be understood as more than a mere reflection of the dominant position of the germ theory. The physical design of the ward is also instrumental in constituting and maintaining the specifics of this theory of disease.

In producing barriers against infections, the ward is ordered into spatial zones. This “regionalization” (Lainer & Wagner, 1998) comes with certain rules of conduct that create and solidify differences between work practices. The airlock is one of these regions. It is the site where parents and staff have to perform several mandatory acts before they are allowed to enter the ward. In other words, to enter the neonatology ward is to engage with a script. This activity scheme is inscribed into the design (inscription) and prescribes a certain use (prescription) (Akrich, 1992). The script defines not so much about the airlock’s actual usage but the various roles and tasks of the users who are involved in its deployment. As such, according to Schmidt (1997) scripts are “not *causal schemes*, but should rather be thought of as *normative constructs*” (p. 144). As a normative construct a script offers a limited selection of prescribed actions while excluding others. The script of the airlock is explicated on several posters on the wall. These posters inform

those who enter to store their coats; bags; jewelry, such as watches, bracelets, and rings (favorite hiding places for bacteria) in lockers; and wash hands and wrists vigorously. The specific way of washing hands is explained on another poster on the wall above the sink. It depicts, for instance, how to close the tap (with elbow) and where to scrub the hands (between the fingers). Only after attending to these ritual procedures are they allowed to pass through the second door that leads into the ward.

However, the airlock is not watertight but permeable. Some bacteria can still find their way in. This is why on reentering the NICU one has to scrub one's hands again. Moreover, entering the incubator, the intimate space of the infant, requires an additional cleaning of one's hands. And, last but not least, one has to clean one's hands again after being done and having closed the incubator's tiny doors. This safety rule is designed to prevent staff members or parents from becoming carriers and initiating cross-contamination between NICU patients. From the periphery (the airlock) to the center (incubator), we see a "trajectory of cleanliness," which is marked by sinks and soap dispensers. Through walls, instructive posters, and a specific distribution of sink and soap dispensers, a particular material order is constituted to guide people along certain routes.

Yet the spatial organization of the unit is by itself not sufficient to compel people to conform to safety regulations. After all, spaces do not determine human behavior, and rules can be ignored. According to Fox (1997), "Architecture is no more than an adjunct, a resource to bolster understandings of what should happen" (p. 650). Whereas instructive posters and the availability of lockers do not determine human behavior, a normative order on (hygienic) rules and responsibilities, the social control of compliance, and professional internalization of the "right" conduct are needed as well. Just like Fox (1997) shows in his study on sterility in operating theatres, "The built environment . . . is thus not *essential*" (p. 656) to the safety measures of the NICU.

Thus, safety measurements result in specific spatial orders. First, by demanding such strict restrictions on entry to the ward, the hospital creates a discontinuity between the neonatology ward (the "isolated island") and the rest of the hospital (the "mainland"). In this spatial order the airlock functions as a transformation zone that mediates between the interior and exterior spaces.⁵ However, the boundaries of this "isolated island" are also fluid in germs as in- and out-born babies, parents, and hospital staff come and go. The neonatology ward is simultaneously bounded and permeable. To enter requires a specific identity, outfit, and behavior. This transformation contributes not only to infection prevention but also to a specific mindset: awareness of the vulnerability of the patients. In this way, the airlock has a priming effect.⁶ As such the neonatology ward resembles another aspect of the heterotopia:

A system of opening and closing that both isolates and makes them penetrable. In general, the heterotopic site is not freely accessible . . . the individual has to submit to rites and purifications. To get in one must have a certain permission and make certain gestures. (Foucault 1986, p. 26)

Second, through the "boundary work" of safety activities the ward is mapped out into different sections: open and restricted places, clean and dirty places, places where you can move freely and where you have to stay put, and "private" and "public" places.⁷ However, the internal differentiation of this hospital space is not fixed. There is a continuous reconfiguration of multiple sociospatial orders. The isolation room is, for example, not only the room where new admissions from outside the hospital are assigned to in order to prevent contamination. The room is also the place where children can die, since it is the only place on the ward that provides some privacy and silence. The specific order that safety practices constitute now intersect with other practices on the ward, such as dying, that imply their own social-spatial arrangement. Explicating these alternate

orderings, which change over time with shifting configurations of actors, helps us expose the normative structure of the multiple processes of ordering. When the lines of activity meet, the openness to varying use of spots and places is less flexible and a normative structure becomes visible. The isolation room as a private place to die competes with the isolation room as a place to prevent contamination. The place to care competes with the place to cure. In certain situations, one spatial meaning will be prioritized over another. There is a hierarchy between spatial meanings and infection control that holds a strong position. However, its top-position is not fixed since the spatial order of safety is only one out of many. After all, the NICU is a place where many different activities are done at the same time. Whether it involves caring or monitoring, therapeutic interventions, research measurements, training, or any other practice, they all bring in their own sociospatial order. These orders define in their own particular way what part of the NICU is central or marginal, what is clean or dirty, or what is open or restricted. The intersection of these lines of activity results in a coexistence of, and sometimes competition between, disparate spatial orders (Mesman, 2009). Also, in this way the ward resembles a “heterotopia” as it is “a relatively segregated place in which several spatial settings co-exist” (Ophir & Shapin, 1991, p. 13).

An admission shows how safety is more than a specific form of action. It is a matter of ordering. It is in “the effort to order the environment in such a way that danger is eliminated or controlled” (Sims, 2005, p. 334). This order is enforced by technical standards, organizational structures, and behavioral norms. The airlock and the isolation room as spatial measures for infection prevention show these distinct “layers of safety practices”: technical standards, organizational structures, and behavioral norms (Sims, 2005). Technical standards dictate the specificities of the architectural design. For example, a specified air pressure and temperature in the airlock, taps that can be shut off by using one’s elbows, or doors that can be opened without touching them, and so forth. The organizational structure will secure, among other things, the number of available staff, timely delivery of clean gowns and removal of the dirty ones, and a restricted entrance policy. Behavioral norms prescribe how to move along the trajectory of cleanliness. In this way, safety becomes more than an organizing principle of space. It organizes group culture as well.

All these ordering efforts are meant to do one thing: immobilize the germs. But to immobilize germs, it is the people and things that are forced to stop and pause: people have to stop to wash their hands, put on a gown, clean their hands again after entering the NICU, and clean their hands again and again. And while doing this they order the ward as clean and dirty areas, and accomplishing this involves, as we will see in the next paragraph, a lot of mobility work.

Collaboration and Its Mobility Work

The other nurses on the ward have followed the conversation between the nurse and the resident. Everyone realizes the new admission can enter the ward any minute now and a lot needs to be done. Janet, the nurse who is responsible for Jill, is already standing behind her incubator to unhook some of the technology, so that it will be possible to wheel out Jill’s incubator. Without being asked, three of her colleagues join her in the little room to help her.

One of the nurses starts to collect all of Jill’s belongings and walks in and out of the isolation room to remove them. Someone else walks to the corridor outside the NICU to get a clean incubator and bedside table. Another nurse helps her colleague to wheel out Jill’s incubator with its connected machinery and IV pole with the numerous IV pumps that manage Jill’s medication and fluid intake. To secure the oxygen supply they wait until the very last moment before unhooking the respiratory machine. When moving the incubator, a nurse supplies oxygen to Jill by ballooning a bag by hand.

As everyone realizes that it is all a matter of time, an ad hoc team takes immediate action. Janet, one of the nurses, said,

In cases like these you have to act as fast as possible. Whether this is possible depends on a lot of things you cannot control, like the situation on the ward. Today we were lucky. The moment the admission arrived, the other children on the ward were doing fine. No special attention or extra help was needed over there. You cannot afford an unexpected admission in the middle of a crisis of another patient, you know. What else was very convenient for us was the fact that the admission was not brought in during one of our control and feeding rounds, but in between the rounds. This made it possible for my colleagues to help me. It is also a matter of collegiality, you know. Attitude is very important in these situations.

Besides the safety of the new patient, an admission like this also requires thorough attention to the safety of the baby who has to be moved. Moving a patient on an NICU is more than just a matter of rolling an incubator from A to B. It is a matter of collecting and reconnecting. For instance, nurses have to unhook all the machinery plugged onto the wall, while making sure that vital functions, such as oxygen supply, and monitoring devices will be continued as long as possible. The nurse behind the incubator has to be sure about what lines and tubes she disconnects at what moment before the baby's transfer to another spot. This requires optimal concentration to prevent mistakes. While moving the incubator, they have to keep an eye on the infant's condition by observing him/her carefully. Depending on the condition of the baby, they have to provide oxygen by ballooning with a bag. After positioning the incubator in its new spot, they have to stay focused to avoid mistakes while reconnecting the technology.

After the room is empty, two nurses start to clean the room meticulously while the other two are busy installing Jill's incubator elsewhere on the ward. When the isolation room is clean, the nurses walk back and forth to the closet on the unit to collect everything needed, such as bed sheets, tape, stethoscope, paper forms, and so on. They set up the new incubator, which is still empty and cold. First they put on its heater to raise the inside temperature as soon as possible. Then they connect all the wires and attach the respiratory machine's tubes to the connecting points in the wall. One of the nurses walks to the refrigerator in the pantry to get some intravenous feeding, while another nurse makes sure that all the devices needed such as the IV system and pumps are positioned next to the incubator. She also puts a set of small tools—including a stethoscope, a pair of scissors and bandages—neatly on the little platform behind the incubator.

Meanwhile the mother and her ill baby-boy have arrived and are waiting. Only when the room is fully ready, the infant is allowed in.

An unplanned admission illuminates the amount of joint action that is needed to deal with the urgency of the moment. To prevent chaos, cooperative work requires an alignment of the separate lines of action of the involved practitioners. Strauss (1988) refers to this coordinative activity as "articulation work." The concept of articulation work refers to all the coordination work that needs to be done to line up the different pieces of work. Articulation work involves, for example, a clustering of different pieces of work, or scheduling activities and allocating resources. With his notion of "articulation work" Strauss has opened up a significant layer of work practices. Besides the more formal "behind the scenes" activity, articulation of work also involves

coordination and customization of activities on the spot while they unfold. As one of the nurses notes,

I think it all went so well and smooth because of the fact that Janet was in charge. She is a very experienced colleague, you know. While she was busy herself she also had a clear overview of what we were doing and what had to be done. She was aware of all the activities that were going on and how much of the procedures were completed. It was on basis of this overview that she delegated the work. So what you need in these kinds of situations is someone who is bold enough to take the lead and can delegate in an undisputable way.

Of course we too know what to do. We all know what is needed for an admission. We have protocols and checklists for these kinds of situations, you know. But in this case we also had to improvise because it was completely unexpected and suddenly there was this mother with her child in a baby seat waiting in the corridor, while there was still another patient in the box (isolation room JM) that had to be moved out first. Luckily there were no student nurses. Everyone involved was very experienced.

The role of the responsible nurse (Janet) turns out to be crucial for the coordination and customization of all the involved activity lines. The notion of “articulation work” directs our attention to this layer of work as being a basic constituent for the accomplishment of the task at hand. Notwithstanding the analytical strength of “articulation work,” Bardram and Bossen (2005) are not satisfied with the position of spatiality in their theory of action. To provide an analytical entrance for the spatial aspects of articulation work, they propose the notion of “mobility work.” “Mobility work designates the work needed to achieve the *right configuration of people, resources, knowledge and place* in order to carry out tasks” (p. 136). Mobility work is the spatial supplement, or even complementary, so they suggest, to articulation work. Bardram and Bossen (2005) stress that “mobility work” should not be equalized with “movement.” “Just as articulation work is achieved through, but not identical to, communication, so mobility work is achieved through, but not identical to movement” (p. 138). This work is not merely concerned with movement as such, but with all the specific movements that are required to achieve the right configuration. Because it highlights the spatiality of coordination, the notion of mobility work can help us describe the spatial aspects of the cooperative work that is required during an unplanned admission as described above. Let us take a closer look at the mobility work involved in this admission.

One phone call sets in motion a lot of people and things. At first sight, the hasty movements of nurses seem chaotic. We see nurses walking around the incubator, connecting and disconnecting machines, switching them on and off, and checking all the equipment connected to and being part of the incubator. They walk in and out of the isolation room to take out and bring in what is needed. Or they even walk in and out of the NICU to collect the needed devices from the corridor. A closer look reveals that the continuous repositioning of people and things has a kind of orderliness—one aimed at a careful readjustment of the NICU space for the new admission to fit in.

Of course, hospitals are busy places where people and things move around all the time. And indeed, the way they move in and out of the isolation room and cross the NICU space reflects the distribution of items over the ward. But the significance of the concept of mobility work lies in the fact that it directs our attention to the notion of “configuration” and its relationship to patient safety. The specific arrangement of people, knowledge, devices, and other resources is right when it not only enables practitioners to take care of the patient but also ensures optimal safety.

The fact that their actions are directed toward a safe patient trajectory helps us understand why, when, and how mobility occurs. For instance, it is for safety reasons that they walk to the sink so often and that they clean the room. It is also for safety reasons that certain things have to be available when they refurbish the room. Likewise, it is not only lack of space but also rules of safety that dictate *when* they move things in and out. Accordingly, they wait to move in pieces of furniture after having cleaned the room meticulously. And, finally, it is safety that motivates them in *how* to deal with the situation and work together behind the incubator to disconnect and reconnect it.

Thus, safety turns out to affect mobility work in two different ways. First, the whole procedure needs to be done safely. This affects both the way the staff members move around and the order of their movements. Second, patient safety compels a specific configuration of people and things: one that supports safety. The staff members' movements start to make sense the moment we understand what they are aiming for. Instead of just seeing people running around and in and out, we now can recognize the underlying logic of their movements.

Their logic of movements is partly codified in standard procedures. The admission protocol of the ward, for instance, comprises the standard setup of an incubator and its direct environment. Now, those who are responsible for the admission know what to do and what to collect with the help of a checklist. To accomplish this task, the nurses have to transport specific items into the isolation room. Subsequently, the location of these items determines the direction and action radius of their movement on the ward. In short, the members of staff not only have to build up a safe configuration, but they also have to accomplish this collaborative effort safely.

To underline the importance of spatiality in collaborative work, Bardram and Bossen (2005) propose the concept of "standard operation configuration" (SOC). SOC, as the spatial counterpart of the standard operating procedures (SOPs), refers to "a spatial setup fostering easy cooperation because of common knowledge and agreement as to use and navigation" (p. 138). Just like SOPs, SOC's should provide a standard layout for the arrangement of people and things. For example, the disconnection and reconnection of the respirator has a standard setup with its own routines of movement. By routinizing the spatial arrangement of work, it minimizes the mobility work needed to constitute the right configuration.

The urgent character of this specific NICU situation creates constant time pressure for the responsible nurse. Being aware of this, Janet's colleagues help her to get the task done as soon as possible. Their collaboration requires a continuous adjustment and readjustment of their movements in accordance with each other's activities. To provide coherent coordinated responses to this unplanned situation at hand, the practitioners are constantly tuned into the conduct of others. The orchestration of their movements involves "mutual monitoring," meaning, a high level of sensitivity to what happens in one's direct environment (Heath & Luff, 1992). Now the staff "organise their conduct so that whilst engaged in one activity, they simultaneously monitor the conduct of others" (Heath & Luff, 1992, p. 77) and as such their additional mobility. Monitoring the movements of the others asks for a space open enough to see each other. Furthermore, it requires the ability to identify forms of conduct and moments for potential, whether involving a change, an opportunity, or a particular problem.⁸ While fine-tuning their actions, they also customize their mobility pattern. As such, safe collaborative actions can be considered as practices of spatial achievement.

The apparently chaotic crisscrossing through NICU space is in fact the result of a two-layered process: mutual monitoring *and* internalization of routines and protocols on admission and the isolation room. It is in this multilayered process that a trajectory of work unfolds with its specific spatial arrangement. This trajectory does not limit itself to one space. To be able to admit the baby to the NICU as fast as possible requires space to act. One way to create this space is to expand the field of activity. Let us go back to the neonatology ward and see how

medical staff actively created a spatial niche that allowed them to do the preparations for the new admission.

How Divergence of Space Enables Convergence of Action

The unexpected admission initiates a rearrangement in and around the isolation room. To address the situation, we also see mobility work going on outside the NICU.

After the phone call, the neonatologist leaves the ward to meet his colleague from the emergency department to hand over the patient. One of the nurses joins him in the corridor to take care of the mother and her newborn baby Sam.

The moment the doctor arrives with the mother and child, the group splits up in to two teams. The neonatologist takes his colleague from the ED to the meeting room because it allows them to discuss the situation without being disturbed. The nurse takes mother and child to the parent room to allow them to wait, while she keeps an eye on the infant's condition. The mother holds Sam in a baby seat she brought from home.

This spatial separation has to be considered as a form of collaboration. Besides "working together," collaboration is also "working apart." Although being dispersed over different places in the ward, they are actually still one team that is working together to deal with an unplanned situation. The urgency of the case demands this kind of "multisited collaboration," because it is this spatial distribution of action that makes parallel lines of work possible. It allows them to do a handover, to accompany a worried mother while monitoring an ill patient, and to prepare the isolation room, all at the same time. In this way, they can handle this unexpected admission expediently and smoothly.

The distribution of work over distinct space can be viewed as a spatial configuration in its own right. It is a "preparatory configuration" that expands the boundaries of the NICU. It supports the accomplishment of the overall task. Thus spaces outside the NICU, but within the neonatology ward, become a resource that is used to carry out the work. A perspective on mobility work, in this case, should not be limited to the NICU, let alone to the isolation room. Equally, analysis of the mobility work needed to achieve the correct results of action should not only be limited to mobility but should also include intentional immobility. In this particular case, "immobilizing mother and child" creates space for the staff to deal with the situation's urgency. For this purpose, the status of the parent room is contested and turned into a waiting area. Normally, this space is the place where doctors discuss delicate matters with parents. Now an alternative order emerges: a place that is quiet enough to monitor the patient. The parent room's "parasitic appropriation" (Lainer & Wagner, 1998, p. 196) not only reflects the contingency of hospital space but also plays an important role in the mindset of the other staff members involved: the mother and child are close and taken care of, but still "outside," so the staff can concentrate on what needs to be done "inside" the NICU.

This distribution of work and location makes much of the work invisible. This creates, in the words of Goffman (1959), the distinction between so-called frontstage and backstage work. However, what is considered as frontstage and backstage work is all a matter of perspective (Tellioglu & Wagner, 2001). From the perspective of the mother in the parent room, the activities of the nurses in the isolation room are happening backstage. What is up front for her is her child. From the perspectives of the nurses inside the NICU, the situation is different. While they prepare the isolation room, they talk about the mother and child as "waiting outside." The nurses interpret their own actions as frontstage work, relegating mother and infant to a backstage setting.

The distribution of action over different places reflects a continuum of scale in space that is needed to build up the right configuration successfully (Bardram & Bossen, 2005). However, patient safety during an ad hoc admission considers not only the new admission but also the baby who still occupies the isolation room. Instead, it concerns all the patients on the NICU. As such the continuum of scale in space incorporates the other babies in the NICU also. For this reason, one of the nurses did not assist her colleagues in the preparation of the admission, but took over their responsibilities and looked after all the other children on the NICU. She resisted, so to say, the inducement of urgency and was not sucked into the swirl of activity but remained outside the flow of action to monitor the safety of the other patients on the NICU. Importantly, it is the specific spatial arrangement of the ward as being one room where the nurse can see all the incubators, hear all the alarms, and thus monitor all the patients that enables her to take this responsibility. It is the absence of walls and curtains and the positioning of the monitors above all the incubators that provide an overview of the multiple incubators. These enable the nurse to maintain the level of safety while being on her own on the NICU.

This awareness of context is one of the basic characteristics of the relationship between spatial arrangements and collaboration.¹⁰ It is important that this kind of responsibility and action belongs to a safe admission procedure. Therefore, a focus on patient safety during an unplanned and urgent admission should not be limited to the activities around the incubator or the handover and the monitoring of the newly admitted patient. It should also pertain to the activities of this one nurse who stays behind.

In short, patient safety is a matter of scale and the required collaboration includes (at least) one “noninvolved” colleague as well. The nurse in this position in fact enables her colleagues to have their hands free to take care of the admission. Although this may sound trivial, in the dynamics of action the professional impulse is to take care of what is urgent and to provide assistance to colleagues. But it takes another kind of professional reflex to resist the call to urgency and redirect one’s focus from one or two patients to all patients in the NICU, as part of the effort to ensure the ward’s overall safety level. A too limited scope would compromise the safety of the other patients.

Interestingly, the continuum of scale has also specific implications at three levels for the analysis of mobility work (Bardram & Bossen, 2005). Mobility work can be analyzed at a micro level, as in the case of the two nurses who reconnect the respirator behind the incubator;¹¹ at a mesolevel, as in studying the overall distribution of the staff involved over the distinct spaces on the ward, and at a macro level, as including the whole patient population. It is of utmost importance that at least one of the staff members continues to concentrate on the overall ward’s safety, instead of engaging in the new admission as well.

Conclusion

An analysis of the relationship between the spatial environment and patient safety activities demonstrates how spatial arrangements direct safety activities although at the same time these very structures are designed and experienced in specific ways as a result of safety activities. The unplanned admission of a home-born baby demonstrates the intertwinement between layers of safety and the spatial layers of the neonatology ward. That is to say: safety is a kind of spatiality. Following practitioners around while they prepare the admission displayed how their safety activities were embedded in a spatial structure that was itself the result of safety considerations. First, scientific knowledge in microbiology is set in stone in the architectural layout of the ward. It requires, for instance, the presence of an isolation room and an airlock before entering the ward. It also provides the technical standards to which these facilities must comply, like automatic doors and certain levels of air pressure. Second, the materialization of scientific knowledge

claims about germs not only divides the ward into specific regions but also creates a very clear boundary between the neonatology ward and the rest of the hospital. The preventive measures against germs turn the ward into a fortification that is hard to enter. Third, it is also through the perspective of safety that the NICU space gets their meaning.

The very same safety activities that shape the spatial environment of the ward are themselves shaped by the physical structures and the particular meaning of the places. For instance, the airlock is a designated space for hygienic practices. Furthermore, it is the trajectory of cleanliness one needs to follow to move across the ward. Also, the limited space on the NICU and in the isolation room in particular demands a redistribution of activities over different places of doctors and nurses and mother and child. Finally, it is the specific layout of the ward that directs the pattern of the mobility work. Nurses move in and out the isolation box, between the NICU and the corridor of the ward, from the pantry in the corridor, back into the NICU, or behind and besides the incubator. It is the specificities of spaces that direct their mobility work while they try to collect and connect everything they need to assemble the right and safe configuration. It is also the heterogeneity of the spatial ordering that enables “working apart” to become a part of “working together,” where “immobility” is part of “mobility work,” and “staying outside the flow of action” becomes “taking part into the event.” In other words, patient safety is a spatial accomplishment. Therefore, the spatial turn in health care should not be limited to studies of patient–nurse proximity, sociospatial power structures, or studies about the impact of places on the way patients experience health and illness and vice versa. Instead, it should incorporate a focus on the relation between safety and space as well.

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Notes

1. Data were collected during extensive fieldwork by conducting ethnographic research for several months in a Dutch hospital between 2008 and 2009.
2. My exploration of the existing resources of safety, notably the informal or unarticulated ones, can be considered as a form of exnovation. Exnovation refers to the attempt to foreground what is already present—though hidden or overlooked—in specific practices (de Wilde, 2000). In the context of patient safety, this attempt is directed at the existing but unnoticed competences and strength of practices that allows them to preserve adequate levels of safety.
3. For another example of a spatial analysis of patient safety, see Mesman (2009) on the production of sterility.
4. In ancient times, the idea prevailed that a disease was spontaneously generated. This idea was replaced by the miasmatic theory that claimed that diseases were caused by pollution (miasma) and as such a matter of “bad air” (Prior, 1988, p. 94). This theory was very strong and remained very influential till the 19th century until it was supplanted by the germ theory. In the germ theory, diseases are caused by microorganisms. Although the first references to microorganisms as causative agents can be found from 500 BC onwards, it was not until the 19th century that the Italian entomologist Bassi laid the theoretical foundation for the germ theory, which, subsequently, was developed further by other scientists such as Pasteur and Koch (Selwyn, 1991).
5. In this case, safety can act as a resource to define the relationship between the neonatology ward and the hospital (Sims, 2005).

6. See Horsley (2008) on the different practices and perceptions in the morgue space.
7. The way I use boundary work in this text should not be confused with Gieryn's (1983) notion of "boundary work," which refers to the demarcation activities of scientists to draw a distinction between science and nonscience.
8. See for the diagnostic work involved in mutual monitoring Mesman (2010).
9. In this way, it mirrors the opposite of the concept of "convergent diversity" as developed by Goodwin (1995) to describe a situation where people may follow rather separate agendas, while using the same place.
10. Besides the awareness of (events, people) context, Lainer and Wagner (1998) refer to regionalization and boundaries as characteristics of this relationship.
11. Compare the notion of micromobility of Luff and Heath (1998).

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Bio

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